

SUSE Linux Enterprise Server

10 SP2

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Architecture-Specific Information



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Preface

This manual describes the steps for installing SUSE® Linux Enterprise Server on IBM eServer i5 and eServer p5, pSeries, JS20/JS21 Blades, and iSeries systems. It contains all necessary information for the preparation of the installation of SUSE Linux Enterprise Server. The installation of SUSE Linux Enterprise Server is described in Chapter 3, *Installation with YaST* (↑Installation and Administration).

Whenever possible, this manual refers to relevant information sources and other documentation on the Internet and on your installed system. Detailed information about Linux device drivers and other technical details are covered in the IBM (online) documentation. Note the respective references.

1 Structure of This Manual

This manual provides information about the hardware and software requirements for successfully installing SUSE Linux Enterprise Server on your system, necessary steps on i5/OS, and the preparation of the eServer i5/p5 firmware, pSeries, JS20/JS21 Blades, and iSeries.

TIP: For More Information about SUSE Linux Enterprise Server on IBM POWER

Find a short introduction to SUSE Linux Enterprise Server on IBM POWER in the *Start-Up Guide* manual of which you received a printed copy. Find a detailed description of the installation procedure and the administration of SUSE Linux Enterprise Server in the *Installation and Administration* manual, which you can find in the local directory `/usr/share/doc/manual` or on the first installation medium in the directory `/docu`.

2 Target Group

Readers of this manual should have some experience in the following areas:

- Use of i5/OS or the pSeries firmware.

- Knowledge of the hardware environment of the IBM pSeries or iSeries system, especially of the network environment.
- Basic Linux and Unix skills.

3 Acknowledgments

The history of Linux is a success story of countless developers around the world who continue what Linus Torvalds once started as a one-man show. We sincerely appreciate their tireless commitment.

We would particularly like to thank all who are involved in the pSeries and iSeries project at IBM and SUSE. Many thanks to the developers at SUSE and IBM, the testers at SUSE, and all beta testers and editors at IBM.

Requirements

1.1 Hardware Requirements

1.1.1 iSeries and i5 Models

Table 1.1 *Supported Models*

iSeries models	i800, i810, i825, i870, i890
eServer i5 and System i5 models	510, 520, 550, 570, 570+, 590, 595

The systems in **Table 1.2, “Unsupported Models”** (page 1) were supported by SUSE® Linux Enterprise Server 9. They are no longer supported but should still run.

Table 1.2 *Unsupported Models*

iSeries models	i270, i820, i830, i840
----------------	------------------------

A standard installation requires at least 256 MB of RAM. An installation over VNC requires at least 448 MB of RAM. The installation of a standard system requires at least 1.8 GB of free hard disk space.

Refer to <http://www-1.ibm.com/servers/eserver/iseries/linux/pdfs/guide.pdf> for a detailed list of all feature codes. An older version of this list

is also available at <http://penguinppc.org/ppc64/machines.php>. Up-to-date hardware information for Linux on System i5 is available at <http://www-03.ibm.com/systems/i/os/linux/servers.html>.

1.1.2 pSeries and p5 Models

These systems are operated with a PPC64 kernel.

Table 1.3 *Supported Models*

pSeries models	p615, p630, p650, p655, p670, p690
eServer p5, System p5, OpenPower, and ATX Server models	505, 510, 520, 550, 560Q, 570, 570+, 575, 575+, 590, 595, 710, 720, 185
ATX Workstation	185

All POWER3 and RS64-based models that were supported by SUSE Linux Enterprise Server 9 are no longer supported, but should still run.

A standard installation requires at least 256 MB of RAM. An installation over VNC requires at least 448 MB of RAM. The installation of a standard system requires at least 1.8 GB of free hard disk space.

Up-to-date hardware information for Linux on System p5 is available by model from <http://www-03.ibm.com/systems/p/linux/>.

1.1.3 BladeCenter

BladeCenter JS20 except JS20 GA1 (model 8842-21X), BladeCenter JS20V, and BladeCenter JS21 are supported systems at the time of printing.

1.2 Software Requirements

1.2.1 IBM iSeries

Find up-to-date information about software requirements at <http://www.ibm.com/servers/eserver/iseries/linux/reqs.html>.

1.2.2 IBM eServer i5 and System i5

Find up-to-date firmware at <http://www-912.ibm.com/eserver/support/fixes/fixcentral>. Select *System i5 family* and *Server Firmware* to find your system model. Updates for the Hardware Management Console can also be selected from this page.

1.2.3 IBM pSeries, IBM eServer p5, System p5, OpenPower

Find up-to-date firmware at <http://www-912.ibm.com/eserver/support/fixes/fixcentral>. Select *UNIX servers* and *Hardware microcode and firmware* to find your system model. Updates for the Hardware Management Console can also be selected from this page.

1.2.4 JS20 Blade and JS21 Blade

Find up-to-date firmware for the BladeCenter at <http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/brandmain?brandind=5000020>.

Preparation

This chapter describes the preparatory steps that must be taken before the actual installation. The installation procedure depends on the system used. See the following documentation:

- For IBM eServer i5/p5 Systems, see [Section 2.1, “Preparing for Installation on IBM eServer i5/p5, System i5/p5, and OpenPower Models”](#) (page 6)
- For IBM pSeries systems, see [Section 2.2, “Preparing for Installation on an IBM pSeries Models”](#) (page 13)
- For IBM JS20/JS21 Blades, see [Section 2.3, “Preparing an Installation on IBM JS20/JS21 Blades”](#) (page 18)
- For IBM iSeries systems, see [Section 2.4, “Preparing an Installation on IBM iSeries Models”](#) (page 22)

If SUSE® Linux Enterprise Server should be installed on a number of systems or partitions, it is recommended to create a network installation source. This eliminates the need to change CDs during the installation. The same source can also be used for the concurrent installation on several partitions or several systems. The configuration of a network installation source is described in Section “Setting Up an Installation Server Using YaST” (Chapter 4, *Remote Installation*, ↑Installation and Administration). For eServer i5, System i5, and iSeries, a network installation source can be set up in a special partition. See [Section 2.4.4, “Creating a Network Installation Source”](#) (page 35) for iSeries.

The installation can be controlled with a VNC client. For more information about VNC, see Section “Simple Remote Installation via VNC—Static Network Configuration” (Chapter 4, *Remote Installation*, ↑Installation and Administration).

To participate in the `linuxppc-dev` mailing list, sign up using the forms at <https://ozlabs.org/mailman/listinfo/linuxppc-dev>. The following links are interesting for the maintenance of an installation:

- <http://www.novell.com/suselinuxportal> is an effective help tool for assisting customers in solving problems. A corresponding article is published whenever SUSE discover that a special case could lead to serious problems. Search the portal using keywords like PPC or POWER.
- Find security alerts at <http://www.novell.com/linux/security/securitysupport.html>. SUSE also maintains two security-related mailing lists to which anyone may subscribe.
- `suse-security` — General discussion of security regarding Linux and SUSE. All security alerts for SUSE Linux Enterprise Server are sent to this list.
- `suse-security-announce` — The SUSE mailing list exclusively for security alerts.

2.1 Preparing for Installation on IBM eServer i5/p5, System i5/p5, and OpenPower Models

This section covers the preparatory steps for installing SUSE® Linux Enterprise Server on IBM eServer i5/p5 systems. It explains the installation from a built-in CD-ROM drive and over the network.

This section assumes you have set up your HMC and connected it to your system. Find more information about using the wizard to configure the HMC in “Configuring the HMC using the Guided Setup Wizard”: <http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp?topic=/iphai/confighmcgs.htm>

2.1.1 Modern Features of IBM eServer i5/p5 Systems

IBM eServer i5/p5 systems offer the possibility to partition the system like on IBM iSeries systems. This enables the concurrent operation of up to 254 operating systems on one machine. These operating systems are installed in *LPARs* (logical partitions). One or several of these partitions can contain a SUSE Linux Enterprise Server environment.

To prepare an LPAR for SUSE Linux Enterprise Server, first configure the system over the *HMC*. Refer to the IBM documentation for details: <http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp?topic=/iphbi/iphbikickoff.htm>

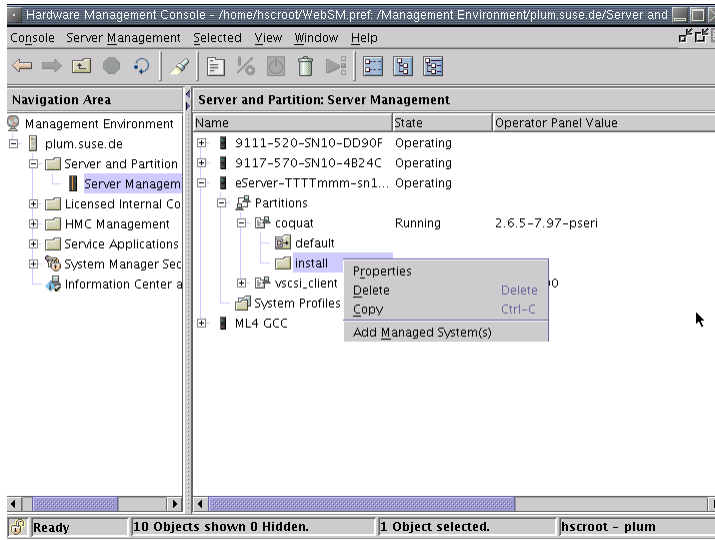
2.1.2 Hard Disk Space

Make sure that you have sufficient hard disk space for installing SUSE Linux Enterprise Server. The standard system requires at least 4 GB of free hard disk space.

2.1.3 Assigning an Installation Device to an LPAR

SUSE Linux Enterprise Server can be installed from a CD-ROM or DVD drive or using a network installation source. Make the CD-ROM, DVD drive, or network device available to the LPAR to install.

Figure 2.1 *HMC: Server Management—Properties*

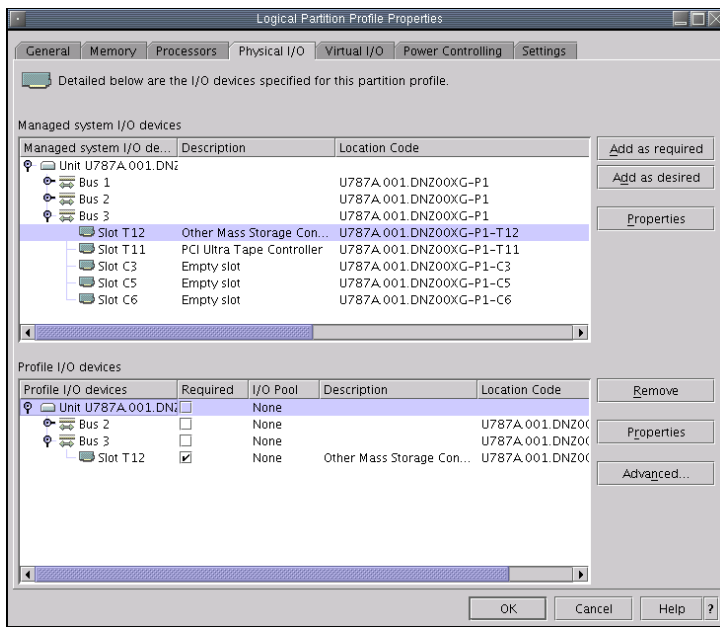


Procedure 2.1 *Assigning a CD-ROM or DVD Drive to an LPAR*

- 1 Open the HMC application and go to *Server and Partition > Server Management*.
- 2 From the available servers, expand the server and partition to *install*.
- 3 Right-click the profile to use for installation and select *Properties*—see [Figure 2.1, “HMC: Server Management—Properties”](#) (page 8).
- 4 In the *Logical Partition Profile Properties* dialog, select the *Physical I/O* tab.
- 5 From *Managed system I/O devices*, select the *Other Mass Storage Controller* from the bus where it is installed. To assign this DVD drive to the partition, click *Add as required*.

The result should look like [Figure 2.2, “HMC: Managed System I/O Devices”](#) (page 9).

Figure 2.2 HMC: Managed System I/O Devices



Now insert the SUSE Linux Enterprise Server CD1 or DVD1 in the drive.

Procedure 2.2 Assigning a Network Device to an LPAR

- 1 Open the HMC application and go to *Server and Partition > Server Management*.
- 2 From the available servers, open the server and partition to install.
- 3 Right-click the profile to use for installation and select *Properties*—see [Figure 2.1, “HMC: Server Management—Properties”](#) (page 8).
- 4 In the *Logical Partition Profile Properties* dialog, select the *Physical I/O* tab.
- 5 From *Managed system I/O devices*, select *PCI 10/100/1000Mbps Ethernet UTP 2-port* from the bus where it is installed. Then click *Add as required*.

If you plan to install using a virtual ethernet adapter, refer to the IBM documentation.

Create a network installation source if SUSE Linux Enterprise Server should be installed on a number of partitions. This eliminates the need to change installation media during installation. The same source can also be used for concurrent installation of various systems. The configuration of the network installation source is described in Section “Setting Up an Installation Server Using YaST” (Chapter 4, *Remote Installation*, ↑Installation and Administration).

2.1.4 Starting the Installation

To start the installation, reboot the system. Right-click the profile name, select *Activate*, and press *OK* in the following dialog.

Use the screen console or connect to a serial console as described in the IBM documentation. One simple way to start a serial console is to open a VTerm while activating the partition. To do this, activate *Open a terminal window or console session* in the *Activate Logical Partition* dialog.

Enter the system firmware by pressing F1 or 1 when using a serial console or a virtual console during the system check when the system is rebooted:

```
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM IBM
```

```
1 = SMS Menu                      5 = Default Boot List
8 = Open Firmware Prompt          6 = Stored Boot List
```

```
memory      keyboard    network    scsi      speaker
```

Press F1 or 1 while the SCSI devices are checked. Select 5. *Select Boot Options* to enter the boot options dialog:

Version SF220_004
SMS 1.5 (c) Copyright IBM Corp. 2000,2003 All rights reserved.

Main Menu

1. Select Language
2. Setup Remote IPL (Initial Program Load)
3. Change SCSI Settings
4. Select Console
5. Select Boot Options

Navigation Keys:

X = eXit System Management Services

Type the number of the menu item and press Enter or select Navigation
Key:5

Select 1. *Select Install/Boot Device* to set the *Install Device*. Go to 7. *List all Devices* to see the list of available devices:

Version SF220_011
SMS 1.5 (c) Copyright IBM Corp. 2000,2003 All rights reserved.

Select Device

Device Number	Current Position	Device Name
1.	-	Virtual Ethernet (loc=U9111.520.10D3CCC-V1-C3-T1)
2.	-	Ethernet (loc=U787A.001.DNZ00XG-P1-T5)
3.	-	Ethernet (loc=U787A.001.DNZ00XG-P1-T6)
4.	-	IDE CD-ROM (loc=U787A.001.DNZ00XG-P4-D3)
5.	1	SCSI 73407 MB Harddisk (loc=U787A.001.DNZ00XG-P1-T10-L8-L0)

Navigation keys:

M = return to Main Menu

ESC key = return to previous screen X = eXit System Management Services

Type the number of the menu item and press Enter or select Navigation Key:

2.1.5 Booting from the CD-ROM Drive

Select the CD-ROM drive (4 in this example):

```
SMS 1.5 (c) Copyright IBM Corp. 2000,2003 All rights reserved.
```

```
-----  
Select Task
```

```
IDE CD-ROM  
  ( loc=U787A.001.DNZ00XG-P4-D3 )
```

1. Information
2. Normal Mode Boot
3. Service Mode Boot

```
-----  
Navigation keys:
```

```
M = return to Main Menu
```

```
ESC key = return to previous screen    X = eXit System Management Services
```

```
-----  
Type the number of the menu item and press Enter or select Navigation Key:
```

Choose *2. Normal Mode Boot* to install from this device. On the next screen, confirm with *1. Yes* to exit *System Management Services* and boot from the device.

The system reads from the CD-ROM drive and the yaboot utility starts:

```
Welcome to SuSE Linux Enterprise 10 (PPC)!
```

```
Type "install"  to start the YaST installer on this CD/DVD
```

```
Type "slp"      to start the YaST install via network
```

```
Type "rescue"   to start the rescue system on this CD/DVD
```

```
Welcome to yaboot version 10.1.22-r938.SuSE
```

```
booted from ...
```

```
Enter "help" to get some basic usage information
```

```
boot:
```

Select *install* from the menu and press Enter. To continue the installation from a different network installation source, select *slp* instead.

To read the installation data from a network install source rather than continuing the installation from the CD-ROM (see [Section 2.1.3, “Assigning an Installation Device to an LPAR”](#) (page 7)), append the option `manual` to the name of the kernel (`install`).

For an installation over VNC, append the parameters `vnc=1` and `vncpassword=password` to the name of the kernel (`install`). Read more about VNC in Section “Simple Remote Installation via VNC—Static Network Configuration” (Chapter 4, *Remote Installation*, ↑Installation and Administration).

2.1.6 Booting from the Network Source

Select an ethernet device that has access to the installation source (2 in this example).

2.1.7 Additional Steps

Proceed as described in Chapter 3, *Installation with YaST* (↑Installation and Administration) to begin installing the software with `linuxrc` and YaST.

2.2 Preparing for Installation on an IBM pSeries Models

This section covers the preparatory steps for installing SUSE® Linux Enterprise Server on pSeries systems. It explains the installation from a built-in CD-ROM drive or a network source.

2.2.1 Special Features of IBM pSeries p630, p655, p670, and p690

IBM p630, p655, p670, and p690 systems offer the possibility to statically partition the system similarly to eServer p5/System p5 (which is described in [Section 2.1, “Preparing for Installation on IBM eServer i5/p5, System i5/p5, and OpenPower Models”](#) (page 6)). This enables the concurrent operation of up to 16 operating systems on one

machine. These operating systems are installed in *LPARs* (logical partitions). One or several of these partitions can contain a SUSE Linux Enterprise Server environment.

To prepare an LPAR for SUSE Linux Enterprise Server, first configure the system over the *HMC*. Refer to the Redbook *IBM eServer pSeries 690 System Handbook* (SG24-7040-00) for details (<http://www.redbooks.ibm.com/redbooks/SG247040/>).

Important notes regarding the configuration:

- The recommended maximum number of processors for a SUSE Linux Enterprise Server LPAR is eight, because the kernel can only manage eight processors effectively.
- For the installation, select *SMS* as the boot mode for the respective partition.
- The *HMC* terminal used for the input during the installation is a VT320 emulation. This emulation can lead to strange effects with some applications. If possible, use an XTerm for communicating with the LPAR.

2.2.2 Hard Disk Space

Make sure that you have sufficient hard disk space for installing SUSE Linux Enterprise Server. The use of a separate hard disk is recommended.

SUSE Linux also supports installing to Fibre Channel–attached storage. Before beginning installation, the Fibre Channel Host Bus Adapter (FCHBA), SAN fabric, and storage system must each be configured to provide access from the FCHBA through the SAN Fabric to target logical units (LUNs) on the storage system.

SAN storage devices, if properly configured, are listed among existing hard disks on your system. *Create Custom Partitioning Setup* opens the dialog, as described in Section “Partitioning” (Chapter 3, *Installation with YaST*, ↑Installation and Administration).

For more information, see <http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp?topic=/iphai/configmcgs.htm>.

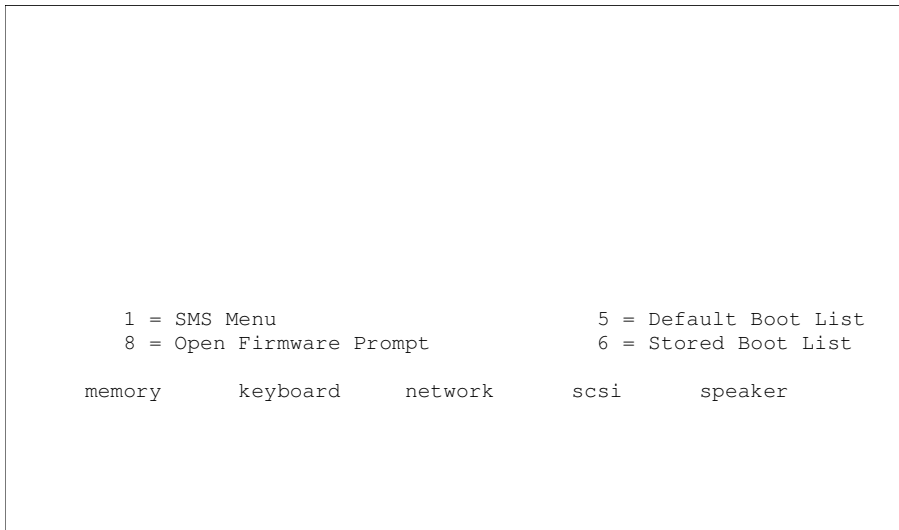
2.2.3 Setting Up the Installation Source

If you plan to install from CD-ROM, insert CD1 in the drive. In LPAR mode, the partition to install must have the CD-ROM in its partition profile. Create a network installation source if SUSE Linux Enterprise Server should be installed over a number of partitions. This eliminates the need to change CDs during installation. The same source can also be used for concurrent installation of various systems. The configuration of the network installation source is described in Section “Setting Up an Installation Server Using YaST” (Chapter 4, *Remote Installation*, ↑Installation and Administration).

2.2.4 Starting the Installation

To start the installation, reboot the system. Then enter the system firmware by pressing F1 or 1 when using the serial console during the system check when the system is rebooted. See [Figure 2.3, “Entering the System Firmware”](#) (page 15).

Figure 2.3 *Entering the System Firmware*



Press F1 or 1 while the SCSI devices are checked. Select *6 MultiBoot* to enter the *Multiboot* dialog. See [Figure 2.4, “Multiboot Dialog”](#) (page 16)

Figure 2.4 *Multiboot Dialog*

```
Version M2P01113
(c) Copyright IBM Corp. 2000 All rights reserved.
-----
Multiboot

1  Select Software
2  Software Default
3  Select Install Device
4  Select Boot Devices
5  OK Prompt
6  Multiboot Startup <ON>

                                                     .------.
                                                     |X=Exit|
                                                     `-----'

===>3
```

Select 3 to set the install device. A list of available devices is displayed. See [Figure 2.5, “Installing the Operating System”](#) (page 16).

Figure 2.5 *Installing the Operating System*

```
Install Operating System

Device Device
Number Name
1      Diskette
2      SCSI Tape id=0 ( slot=50322f5a )
3      SCSI CD-ROM id=1 ( slot=50322f5a )
4      Ethernet  ( Integrated )
5      SysKonnec PCI FDDI Adapter  ( slot=4 )
6      Ethernet  ( slot=2 )
7      None

                                                     .------.
                                                     |X=Exit|
                                                     `-----'

===>3
```

2.2.5 Booting from the CD-ROM Drive

Select the respective CD-ROM drive (3 in this example). The system reads from the CD-ROM drive and displays the *identstring*.

```
->1    SUSE Linux SLES-9 (PPC)<-
```

After you select 1, the yaboot utility is started.

```
Welcome to SuSE Linux Enterprise 10 (PPC)!
```

```
Type  "install"  to start the YaST installer on this CD/DVD
Type  "slp"      to start the YaST install via network
Type  "rescue"   to start the rescue system on this CD/DVD
```

Select *install* from the menu and press Enter. Alternatively, just press Enter to start the installer, the default option.

To install from a network source (see [Section 2.2.3, “Setting Up the Installation Source”](#) (page 15)), append `manual` to the kernel to `install`. For an installation over VNC, append the parameters `vnc=1` and `vncpassword=password` to `install`. Read more about VNC in Section “Simple Remote Installation via VNC—Static Network Configuration” (Chapter 4, *Remote Installation*, ↑Installation and Administration).

In LPAR mode, the partition to install must have the CD-ROM in its partition profile.

If yaboot cannot be started, launch the loading process manually:

- Select OK from SMS and the firmware prompt appears.
- Check the alias list of the available devices: `0> devalias`.
- Enter the *boot string* with the required alias (in this example: `cdrom`).

To boot a ppc64 kernel:

```
0> boot cdrom;,\suseboot\inst64
```

To boot a ppc32 kernel:

```
0> boot cdrom;,\suseboot\inst32
```

2.2.6 Booting from the Network Source

Select an ethernet device that has access to the installation source (6 in this example).

2.2.7 Additional Steps

Proceed as described in Chapter 3, *Installation with YaST* (↑Installation and Administration) to begin installing the software with linuxrc and YaST.

2.3 Preparing an Installation on IBM JS20/JS21 Blades

This section describes the preparatory steps for the installation of SUSE® Linux Enterprise Server on JS20/JS21 Blades. It covers installation using the CD-ROM drive of the BladeCenter and using the network.

2.3.1 Creating a Network Installation Source

Create a network installation source if SUSE Linux Enterprise Server should be installed over a number of partitions. This provides the advantage that no CDs need to be changed during installation. The same source can also be used for the concurrent installation of various systems. Configuration of a network installation source is described in Section “Setting Up an Installation Server Using YaST” (Chapter 4, *Remote Installation*, ↑Installation and Administration).

2.3.2 Hard Disk Storage Space

Ensure that enough hard disk storage space is available for the installation of SUSE Linux Enterprise Server. It is recommended to use a dedicated hard disk.

2.3.3 Notes and Information

Introductory Information:

- JS20/JS21 Blades Site: <http://www-03.ibm.com/servers/eserver/bladecenter/literature/>

2.3.4 Preparing the System for Boot

Preparing to Boot from the CD-ROM Drive

Perform the steps described in this section if an installation from CD-ROM is desired.

Assign the CD-ROM drive to the Blade chosen for installation by connecting with a Web browser to a BladeCenter Management Module then logging in. After login, select the function *Remote Control* in the menu *Blade Tasks* then activate *Start Remote Control*. Assign the CD-ROM drive to the desired blade in the menu *Change Media Tray Owner* of the new window.

Then set up the CD-ROM drive as a boot device. Do this by selecting *Blade Tasks* then *Configuration* while in the BladeCenter Management Module. Then select the JS20/JS21 Blade in the section *Boot Sequence*. Set the entry for *1st Device* on the page for *Blade Boot Sequence* to *CDROM*.

Put CD 1 in the CD-ROM drive and restart the blade.

Preparing to Boot from the Network

Perform the steps as described in this section if an installation over the network is desired.

Connect to the BladeCenter Management Module using a Web browser and log in. Set the boot device to the network by accessing the *Configuration* menu from the *Blade Tasks* page. Then select the JS20/JS21 Blade in the section *Boot Sequence* and set *1st Boot Device* to *Network — BOOTP* on *Blade Boot Sequence*.

Rebooting and Connecting to the Console of the JS20/JS21 Blade

Reboot the JS20/JS21 Blade from the item *Power/Restart* of the *Blade Tasks* menu in the BladeCenter Management Module. A table appears, showing the power status of

the blades in the *Pwr* column. Mark the check box of the desired blade and restart it with *Power On Blade*.

Connect to the BladeCenter with the command `telnet bladecenter` and log in.

```
username: user
password: *****
system>
```

The command `env -T system:blade[bay number]` determines for which JS20/JS21 Blade the subsequent commands are intended. The blades installed in the BladeCenter are listed by calling `list -l 3`.

```
system> list -l 3
system
      mm[1]      primary
      power[1]
      power[2]
      power[3]
      power[4]
      blower[1]
      blower[2]
      switch[1]
      switch[3]
      blade[1]
              sp
              cpu[1]
              cpu[2]
      blade[3]
              sp
      blade[4]
              sp
      blade[6]
              sp
      blade[8]
              sp
              cpu[1]
              cpu[2]
      blade[9]
              sp
              cpu[1]
              cpu[2]
      blade[10]
              sp
      blade[11]
              sp
      blade[13]
              sp
```

```
mt
system>
```

The *command target* is then determined. To work, for example, with blade number 9, enter `env -T system:blade[9]`. Connect with the console of the JS20/JS21 Blade over *Serial over LAN (SOL)* with the command `console`.

```
system> env -T system:blade[9]
OK
system:blade[9]> console
```

Starting the Installation

The SUSE Linux Enterprise Server boot loader starts after the system check has completed.

```
Config file read, 149 bytes
```

```
Welcome to SuSE Linux (SLES-9)!
```

```
Use "install"      to boot the pSeries 64bit kernel
Use "install32"    to boot the 32bit RS/6000 kernel
```

```
You can pass the option "noinitrd" to skip the installer.
Example: install noinitrd root=/dev/sda4
```

```
Welcome to yaboot version 1.3.11.SuSE
Enter "help" to get some basic usage information
boot:
```

Select *install* from the menu and press Enter.

In the case of an installation over VNC, append the parameters `vnc=1` and `vncpassword=password` to the command line for the kernel (install).

Additional Steps

Proceed as described in Chapter 3, *Installation with YaST* (↑Installation and Administration) to begin installing the software with `linuxrc` and YaST.

2.4 Preparing an Installation on IBM iSeries Models

An iSeries system must be prepared on the i5/OS side before installing SUSE® Linux Enterprise Server. This section describes the installation with a built-in CD ROM drive.

TIP

The steps in this section are especially written for installation on iSeries systems running IBM i5/OS V5R3. They can also be performed on IBM i5/OS V5R4 and V5R2. Additional options only available to i5/OS V5R2 are described in *Linux in a guest partition* available at <http://publib.boulder.ibm.com/infocenter/iseriess/v5r4/index.jsp?topic=rzalm/rzalmlinuxkickoff.htm>.

The support portal often features articles about common problems. Access this portal at <http://www.novell.com/suselinuxportal>.

This chapter was compiled in close cooperation with Christopher Abbey, James Srebbing, Jay S. Bryant, and Brent Baude.

2.4.1 Resources

Introductory Resources

- The iSeries site located at <http://www.ibm.com/servers/eserver/iseriess/linux/>
- The IBM Linux on iSeries Redbook: <http://publib-b.boulder.ibm.com/Redbooks.nsf/RedbookAbstracts/sg246232.html>
- The iSeries on Linux system guide: <http://www.ibm.com/servers/eserver/iseriess/linux/pdfs/guide.pdf>
- Linux in a guest partition: <http://publib.boulder.ibm.com/infocenter/iseriess/v5r4/index.jsp?topic=rzalm/rzalmlinuxkickoff.htm>

- Information about Linux on LPARs: <http://publib.boulder.ibm.com/series/v5r1/ic2924/index.htm?info/rzalm/rzalmlinuxkickoff.htm>

2.4.2 Necessary Steps Concerning i5/OS

The following section assists in the configuration of an iSeries system when installing SUSE Linux Enterprise Server. Detailed reference information about how to create partitions for Linux is contained in the following documents:

- For i5/OS V5R2: <http://publib.boulder.ibm.com/series/v5r2/ic2924/index.htm?info/rzalm/rzalmlinuxkickoff.htm>
- For i5/OS V5R3: <http://publib.boulder.ibm.com/series/v5r3/ic2924/index.htm?info/rzalm/rzalmlinuxkickoff.htm>

The Redbook *Linux on iSeries* (SG24-6232-00) provides detailed information (<http://publib-b.boulder.ibm.com/Redbooks.nsf/RedbookAbstracts/sg246232.html>).

The configuration of a system on the i5/OS side requires an i5/OS system access with *SERVICE permissions and authority to access SST. A DST password for creation of a console user is also required. A 5250 terminal or a 5250 emulation package is required to be able to connect to i5/OS (like TN5250 on Linux or PCS or Client Access on Windows).

Partitioning the System

Create a new system partition for SUSE Linux Enterprise Server first. Use the main option number 5 *Work with System Partitions*, suboption 5 *Create a new Partition* in STRSST. Use the main option 3 *Work with Partition Configuration*, suboption 2 *Change Partition Processing Resources* if the partition already exists.

Figure 2.6 *Creating a New Partition*

```

                                Create New Partition
                                System:    SUSE1
Complete blanks, press Enter.

Partition identifier and name . . . . . 3__ GINGER__

Number of available system processors . . . : 1
Number of partition processors . . . . . 1__
Minimum / maximum number of processors ... . 0__ / 1__
Use shared processor pool . . . . . 2 1=Yes, 2=No

Size of available system main storage (MB) . : 256      / 44
Size of partition main storage (MB) . . . . . 256__
Minimum / maximum size of main storage (MB) . 0__ / 752__

F3=Exit   F9=Exclude limits   F10=Work with shared processor pool
F11=Display partition processing configuration   F12=Cancel
```

Figure 2.7 *Changing Partition Processing Resources*

```

                                Change Partition Processing Resources
                                System:    SUSE1
Type changes, press Enter.

Partition identifier and name .... : 3    GINGER

Current / available number of processors ...: 1    / 0
New number of processors .... : 1__
Use shared processor pool .... : 2 1=Yes, 2=No

Current / available size of main storage (MB) : 256    / 44
New size of main storage (MB) .... : 256__

F3=Exit   F9=Include limits   F10=Work with shared processor pool
F11=Display partition processing configuration   F12=Cancel
```

Try to plan your minimum and maximum values for the processor (*Minimum / maximum number of processors*) and main storage (*Minimum / maximum size of main storage*) accurately because changing these values requires a primary partition IPL.

Figure 2.8 *Changing Partition Processing Resources*

```
Change Partition Processing Resources
System: SUSE1
Type changes, press Enter.

Partition identifier and name .. . . . . : 3    GINGER

Current / available number of processors .. . : 1    / 0
New number of processors .. . . . . . . . . 1__
Minimum / maximum number of processors .. . . 0__ / 1__
Use shared processor pool .. . . . . . . . . 2  1=Yes, 2=No

Current / available size of main storage (MB) : 256      / 44
New size of main storage (MB) .. . . . . . . 256__
Minimum / maximum size of main storage (MB) .. 0__ / 752__

F3=Exit   F9=Exclude limits   F10=Work with shared processor pool
F11=Display partition processing configuration   F12=Cancel
```

Confirm the changes with Enter to start the process for creating a new partition.

An IPL is required after creating a new partition.

Configuring the Virtual Ethernet (System Tools)

Use *System Service Tools* (STRSST) to configure the *Virtual Ethernet*. Select F5 (*Work with system partitions*), F3 (*Work with partition configuration*), then F10 to change the virtual LAN configuration. Pressing F9 shows all partitions, even the ones not yet linked.

Figure 2.9 Working with the Virtual LAN Configuration

```

                                Work with Virtual LAN Configuration
                                System:  SUSE1
Type options, press Enter.
  2=Change

  Par
Opt ID Name  -----Virtual LAN Identifiers-----
-   0 PRIMARY 1 . . . . . . . . . . . . . . . . . .
-   1 PEPPER  1 . . . . . . . . . . . . . . . . . .
-   2 CURRY   1 . . . . . . . . . . . . . . . . . .
-   3 GINGER  1 . . . . . . . . . . . . . . . . . .

'1' Indicates LAN in use.  '.' Indicates LAN not in use.
F3=Exit                    F9=Show only partitions using Virt
F11=Display communication options  F12=Cancel
```

Figure 2.10 Changing the Virtual LAN Configuration

```

                                Change Virtual LAN Configuration
                                System:  SUSE1
Partition identifier . . . . . : 3
Partition name . . . . . : GINGER

Type changes, press Enter.
  1=Yes  2=No

  -----Virtual LAN Identifiers-----
  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
  1  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2

F3=Exit  F12=Cancel
```


Partitioning Tips—Processors, Memory, NWSDs, and LPARs

- Run STRSST (Start System Service Tools) and select 5 (*Work with system partitions*), then 3 (*Work with partition configuration*), and assign the host partition for the guest by entering 13 in the field next to the partition name.
- Declare a memory range for configuration in the LPAR (Logical Partition). This is the minimum and maximum amount of memory assigned to this LPAR without a primary IPL (Initial Program Load). The settings for the maximum amount should also reserve space for the Hardware Page Table (HPT). However, having too large of a maximum memory would cause a larger hardware page table to be allocated from the partition's memory, reducing the amount Linux can use.

To calculate the memory available to an LPAR, use this formula:

("Configured Memory" minus "Maximum Memory of the LPAR Configuration")
divided by 64

The result is rounded up to a multiple of 2.

Example: The maximum size should be 248 MB. Assuming 1/64 of this value to be taken up by the HPT, the result of 3.875 MB is rounded up to the value of 4 MB.

- Minimum memory requirements must be met. For a text-based installation, assign the LPAR at least 256 MB. An installation with VNC requires at least 448 MB.

Assigning Network Storage Space

Next, assign SUSE Linux Enterprise Server some storage space. Do this with the utility CRTNWSSTG.

Figure 2.11 *Creating NWS Storage Space (CRTNWSSTG)*

```

                                Create NWS Storage Space (CRTNWSSTG)

Type choices, press Enter.

Network server storage space.. > GINGER0_      Name
Size.. . . . . . . . . . . . . . . . . . . . 9000__ *CALC, 1-64000 megabytes
From storage space.. . . . . . . . . . . . . . *NONE__ Name, *NONE
Format.. . . . . . . . . . . . . . . . . . . . *open__ *NTFS, *FAT,*FAT32,*OPEN
Auxiliary storage pool ID . . . . . . . . . . . 1__ 1-99
Text 'description' . . . . . . . . . . . . . . ginger_root_disk_____

                                                                    Botto
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this di
F24=More keys
Creating NWS storage space GINGER0: 32 of 9000 megabytes complete.
```

Creating the Network Server Description

The *Network Server Description* combines the individual configuration settings to one object.

Figure 2.12 *Creating a Network Server Description (CRTNWS D)*

```

                                Create Network Server Desc (CRTNWS D)

Type choices, press Enter.

Network server description . . .   ginger__      Name
Resource name . . . . .           *NONE__      Name, *NONE
Network server type . . . . .      *guest__      *WINDOWSNT, *GUEST

                                                                    Botto
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this di
F24=More keys
Parameter NWS D required.
```

Change the following settings:

- NWS D name
- Network server type = *GUEST
- Partition = *enter the partition name here*
- Code page = 437
- IPL source = *STMF
- IPL stream file = '/QOPT/SLES100.001/SUSEBOOT/inst64'. SU90.001 is the disk label of the boot CD. To find out the disk label, insert the CD and enter DSPLNK QOPT at a command prompt. For Service Pack 2, for example, the parameter is /QOPT/SLES100SP2.001/SUSEBOOT/inst64.

The statements made in [Section 2.4.4, “Creating a Network Installation Source”](#) (page 35) are valid for network-based installations.

- IPL parameters = 'vnc=1 vncpassword=suseinst'

- Text description = SUSE Linux Enterprise Server
- Online at IPL = *YES

Figure 2.13 *Creating a Network Server Description (CRTNWSD)*

```

                                Create Network Server Desc (CRTNWSD)

Type choices, press Enter.

Network server description ... > GINGER__      Name
Resource name ... . . . . . *NONE__      Name, *NONE
Network server type ... . . . > *GUEST__      *WINDOWSNT, *GUEST
Online at IPL ... . . . . . *NO            *YES, *NO
Vary on wait ... . . . . . *NOWAIT         *NOWAIT, 1-15 minutes
Partition ... . . . . . > GINGER__      Name
Code page ... . . . . . 437__          *LNGVER, 437, 850, 852, 857
Server message queue ... . . . *JOBLOG__    Name, *JOBLOG, *NONE
Library ... . . . . .      __      Name, *LIBL, *CURLIB
TCP/IP port configuration:
  Port ... . . . . . *NONE__      *NONE, *INTERNAL, 1, 2, 3
  Internet address ... . . . .      __
  Subnet mask ... . . . . .      __
  Maximum transmission unit ..      __      Number
    + for more values _
TCP/IP local host name ... . . *NWSD__
TCP/IP local domain name ... . *SYS__
TCP/IP name server system ...  *SYS__
    + for more values      __
Restricted device resources .. *NONE__      Name, *NONE, *ALL...
    + for more values      __
Synchronize date and time ... *TYPE            *TYPE, *YES, *NO
IPL source ... . . . . . > *STMF__      *NWSSTG, *PANEL, *STMF, A
IPL stream file ... . . . . > '/QOPT/SU90.001/ISERIES64'__
IPL parameters ... . . . . . 'vnc=1 vncpassword=suseinst'__
Authority ... . . . . . *LIBCRTAUT      Name, *LIBCRTAUT, *CHANGE
Text 'description' ... . . . . > 'SUSE Linux Enterprise Server'__

                                                                Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this dis
F24=More keys

```

It is possible to pass additional IPL parameters for VNC. Refer to Section “Booting the Target System for Installation” (Chapter 4, *Remote Installation*, ↑Installation and Administration).

The IPL stream file can be queried from the i5/OS command line with the command `DSPLNK('QOPT')`.

Linking the Network Storage Space with the Network Server Description (WRKNWSSTG)

The newly created storage space needs to be linked with the Server Description. First select the storage space from the list.

Figure 2.14 Work with Network Server Storage Spaces

Work with Network Server Storage Spaces

System: SUSE1

Type options, press Enter.

1=Create 3=Copy 4=Delete 5=Display 6=Print 10=Add link
11=Remove link

Opt	Name	Percent Used	Size	Server	Drive	Format	Access	ASP
—	CURRY0	0	2000	CURRY	1	*OPEN	*UPDATE	1
—	CURRY1	0	2000	CURRY	2	*OPEN	*UPDATE	1
10	GINGERO	0	9000			*OPEN		1
—	TEST	0	1500			*OPEN		1

Bottom

Parameters or command

==>

F3=Exit F4=Prompt F5=Refresh F6=Print list F9=Retrieve
F11=Display text F12=Cancel F17=Position to

The link to the Network Server Description is then established.

Figure 2.15 *Adding the Network Server Storage Link (ADDNWSSTGL)*

```

                                Add Network Server Storage Link (ADDNWSSTGL)

Type choices, press Enter.

Network server storage space . . > GINGER0           Name
Network server description . . . > GINGER           Name
Drive letter . . . . . *FIRSTAVAIL          K-Z
Dynamic storage link . . . . . *yes           *NO, *YES
Network server type . . . . . *NWSD          Character value
Drive sequence number . . . . . *CALC          3-18, *CALC

                                Additional Parameters

Access . . . . . *UPDATE          *UPDATE, *READ

                                Botto
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this di
F24=More keys
```

Additional Steps

The instructions in [Section 2.4.3, “Client for the Operation of the Installation Software”](#) (page 32) explain how to configure a virtual console for operating the installation software.

2.4.3 Client for the Operation of the Installation Software

This section describes the configuration of telnet access to the virtual console.

Supported Terminals

Table 2.1 *Supported Terminal Emulators*

Operating System	Terminal	Support
Linux	Linux console	Fully supported

Operating System	Terminal	Support
Linux	Standard Xterm	Fully supported
Linux	GNOME terminal	Fully supported
Linux	KDE terminal	Fully supported
Linux	screen	Fully supported
Windows	PuTTY	Fully supported
Windows	Telnet client in Windows 98	Not supported
Windows	Telnet client in Windows 2000	Not supported
Windows	Telnet client in Windows XP	Not supported
AIX	aix xterm	Not supported

IMPORTANT

Using a fully supported terminal emulator makes all features of the installation software accessible, including key combinations and colors.

When installing from a Windows machine, the freely available telnet client PuTTY should be used in all cases. The configuration and operation of PuTTY is described as part of the documentation coming with the PuTTY (see `/dosutils/putty` on the installation medium or <http://the.earth.li/~sgtatham/putty/0.58/html/doc/>). The telnet client shipped with Windows 98 is not supported. The telnet clients shipped with Windows 2000 and Windows XP can be used, but offers only a restricted usage of the installation software.

`aixterm` generally does not cooperate too well with Linux. A workaround solution is to start an xterm on AIX and set the terminal manually with `TERM=vt100`. Because this is not possible during installation, a different platform should be used.

When operating the Linux terminal multiplexer `screen`, it is recommended to adjust the setting for `background-color-erase` because the background would otherwise

be displayed black instead of reflecting the color indicated by the installation software. To achieve this, insert the following entry in the file `~/ .screenrc`:

```
defbce on
```

To change this setting for just one single window, use `Ctrl + A ;`, enter `bce`, and press Enter.

Recognizing the Virtual Console Terminal

When accessing the virtual iSeries console with telnet, Linux probes the telnet client to attain the best operability. The following settings are especially important:

- Is more than one connection active? (If yes, a warning is issued)
- What type of terminal is connecting?
- Is it a Windows-based terminal?
- What is the screen size?

This probe is performed during the start-up phase of the installation software as well as during logins to the installed system.

The i5/OS telnet server offers the possibility to maintain several concurrent connections to a Linux console.

IMPORTANT

The probe fails if more than one session is connected, resulting in erroneous assumptions regarding terminal settings. Multiple concurrent connections should therefore be avoided.

Forcing a Terminal Initialization

The terminal detection and initialization can also be forced manually on an installed system with the command `initviocons`. If you change the terminal size during a session, do not forget to initialize the terminal again with the command `initviocons`.

Troubleshooting Terminal Problems

- Ctrl + L redraws the screen. This is useful if it looks odd or broken.
- linuxrc displays broken line art. This is a known problem that is not related to the terminal application.
- A terminal connected when an installation aborted (for example, by a sudden shutdown of the LPAR) may be badly configured upon reconnection. A fresh application window should be opened in this case.
- If the <— key in the KDE program Konsole does not work, change the settings for the *Keyboard* in the *Settings* menu to `xterm` or `linux console`.
- The <— key might not work properly in VT100 fallback mode. This depends on the settings of the telnet client. If <— does not work, try using one of the following combinations:
 - Ctrl + H
 - Ctrl + ?
 - Ctrl + Backspace
 - Delete + <—
 - Ctrl + D + <—

2.4.4 Creating a Network Installation Source

Create a network installation source if SUSE Linux Enterprise Server should be installed over a number of partitions. This eliminates the need to change CDs during installation. The same source can also be used for concurrent installation of various systems. The configuration of the network installation source is described in Section “Setting Up an Installation Server Using YaST” (Chapter 4, *Remote Installation*, ↑Installation and Administration).

Copy the file `ISERIES64` from the installation source to the i5/OS IFS using FTP:

```
ftp iseries
(login)
```

```
ftp> cd /kernels
ftp> bin
ftp> put ISERIES64
ftp> bye
```

The installation can then be started as described before. Do not forget to change the IPL Source before doing this:

```
IPL source . . . . . *STMF__ *SAME, *NWSSTG, *PANEL...
IPL stream file . . . . . '/kernels/ISERIES64'_____
IPL parameters . . . . . 'vnc=1 vncpassword=suseinst'__
```

It is additionally possible to pass parameters for VNC. Refer to the *Installation and Administration* manual for information.

Additional Steps

Start (IPL) the kernel as described in [Section 2.4.5, “IPL: Starting the NWSD \(WRKCFGSTS *NWS\)”](#) (page 36).

2.4.5 IPL: Starting the NWSD (WRKCFGSTS *NWS)

Establish a connection to the virtual console with PuTTY or to telnetd port 2301 with one of the supported terminals. Start the installation kernel (IPL) by activating Option 1 in the target NWSD. Watch the kernel messages on the virtual console carefully.

Figure 2.16 Working with the Configuration Status

```
Work with Configuration Status          SUSE1
                                     12/03/01 17:45:21
Position to . . . . .  _____ Starting characters

Type options, press Enter.
  1=Vary on   2=Vary off   5=Work with job   8=Work with description
  9=Display mode status   13=Work with APPN status...

Opt  Description      Status      -----Job-----
--
CINST      VARIED OFF
CURRY      ACTIVE
1_ GINGER      VARIED OFF
PEPPER     VARIED OFF
PEPPERI    ACTIVE
TEST      VARIED OFF

Parameters or command
===> _____

F3=Exit   F4=Prompt   F12=Cancel   F23=More options   F24=More keys
```

Watch the virtual console. linuxrc appears in the case of a network or VNC installation and requests the user to make a few choices.

The IPL of the file ISERIES64 starts linuxrc in the case of a network installation. The following steps are then necessary:

1. Select the desired language in linuxrc.
2. Select the *Kernel Modules (Hardware Drivers)* to load.
3. Select *Load ppc_iseries modules* and load the appropriate network module.
4. Select *Back* then *Start Installation or System*.
5. Select the installation source. Three options are available:

CD-ROM

This offers to install from an internal CD-ROM drive. Before the system accesses the CD-ROM, enter the network parameters for the installation over VNC.

Network

Allows the installation from an NFS share. The necessary network parameters are requested along with the hostname or IP address of the NFS server. Also enter the path to the NFS share.

Hard Disk

Use this when the installation files are available on another hard disk. Enter the device name including the partition and the path to the installation files (for example, `/dev/sdb1` and `/suse`). Before the system accesses the hard disk, the network parameters for the installation over VNC are requested for input.

You are then directed to start the VNC client. See [Example 2.1, “The Installation over VNC Can Begin”](#) (page 38).

Example 2.1 *The Installation over VNC Can Begin*

```
starting VNC server...
a log can be found in /tmp/vncserver.log ...
*** ** You can connect to 192.168.0.154, display :1 now ***
(When YaST2 is finished, close your VNC viewer and return to this
window.)
```

Start the VNC client with the displayed parameters (192.168.0.154:1 in this example) and enter the VNC password (`suseinst` in this example). The graphical interface of VNC appears and YaST starts a few seconds later.

Additional Steps

Proceed with Chapter 3, *Installation with YaST* (↑Installation and Administration) to start the installation of the software.

A

Appendix

A.1 Editing the Built-In Kernel Command Line in a zImage

For kernels on POWER systems the `mkzimage_cmdline` utility adds kernel command line options to the kernel image. This options string is passed to the kernel, its contents overwriting the contents of `/options/boot-file`. This utility is available on all architectures, but it only works on POWER kernel images.

For more information, see the `mkzimage_cmdline` man page. For example, use the command as follows:

```
mkzimage_cmdline -a 1 \  
-s 'install=nfs://192.168.0.20/inst_server/path vnc=1 vncpassword=password \  
linuxrcstderr=/dev/console' /tftpboot/kernel_image
```

For a network installation, the `install` parameter is required.

A.1.1 Specifying the Installation Source and YaST Interface

`Install=nfs://server/directory`

Specify the location of the installation source to use. Possible protocols are `nfs`, `smb` (Samba/CIFS), `ftp`, and `http`.

If an `ftp` or `smb` URL is given, specify the user and password for installation. These parameters are optional and an anonymous or guest login is assumed if they are not given.

```
Username=<a user name>  
Password=<a password>
```

For a Samba or CIFS installation, you can also specify the domain that should be used:

```
Workdomain=<a domain>
```

```
UseSSH=1 , UseVNC=1 , Display_IP=192.168.42.42
```

Depending on which parameter you give, a remote X, SSH, or VNC server is used for installation. `UseSSH` enables SSH installation, `UseVNC` starts a VNC server on the installing machine, and `Display_IP` causes the installing system to try to connect to an X server at the given address. Only one of these parameters should be set at any time.

IMPORTANT: X Authentication Mechanism

Direct installation with the X Window System relies on a primitive authentication mechanism based on hostnames. This mechanism is disabled on current SUSE Linux Enterprise Server versions. Installation with SSH or VNC is preferred.

To allow a connection between YaST and the remote X server, run `xhost <IP address>` with the address of the installing machine on the remote machine.

For VNC, specify a password of six to eight characters to use for installation:

```
VNCPassword=<a password>
```

For SSH, specify a password of six to eight characters to use for installation:

```
SSHPassword=<a password>
```

A.1.2 For More Information

Find alternative documentation for the setup of a network installation server and client on the first installation medium in `/docu as PureNetworkInstall.HOWTO`.

